

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN RE PCT NATIONAL STAGE APPLICATION OF  
WICHERT, ET AL

INTERNATIONAL APPLICATION NO:

PCT/EP2004/010960

FILING DATE: March 3, 2005

U.S. APPLICATION NO: 10/598,993

35 USC §371 DATE: July 3, 2007

FOR: PROCESS FOR PURIFYING MESOTRIONE

Art Unit: 1621

Examiner: Nwaonicha, Chukwuma

Conf. No.: 3029

Mail Stop Appeal Brief - Patents  
Commissioner of Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

**TRANSMITTAL OF APPEAL BRIEF**

Appellants submit herewith an Appeal Brief in furtherance of the Notice of Appeal, filed in this case on June 22, 2009. This Brief is timely if filed by September 22, 2009 upon grant of an extension of time of one (1) months.

Appellants enclose herewith the fee required under 37 C.F.R. 41.20(b)(2), the required petition for extension of time for filing this brief and fees therefore. Accordingly, Appellants enclose a credit card authorization for all requisite fees. Appellants authorize the Commissioner to charge any additional fees that are due or credit any overpayments to Deposit Account No. 50-1676 in the name of Syngenta Crop Protection, Inc.

Respectfully submitted,

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Date: Tuesday, September 22, 2009

## **I. REAL PARTY IN INTEREST**

The real party in interest in this appeal is Syngenta Crop Protection, Inc.

## **II. RELATED APPEALS AND INTERFERENCES**

With respect to other appeals or interferences that will directly affect, or be directly affected by, or have a bearing on the Board's decision in this appeal, there are no such appeals or interferences.

### **III. STATUS OF CLAIMS**

The status of the claims in this application is:

Claims 1 – 8 are in the application.

Claims 1 – 8 have been rejected.

The claims on appeal are 1 – 8.

#### **IV. STATUS OF AMENDMENTS**

The response dated June 22, 2009 filed subsequent to the March 20, 2009 final rejection has been entered.

## V. SUMMARY OF CLAIMED SUBJECT MATTER

The subject matter of the instant claims is a method for reducing the cyanide levels in a mesotrione sample, said method comprising:

- (i) taking an aqueous solution of the mesotrione sample in an aqueous solvent,
- (ii) adjusting the pH of said aqueous solution to a value of 9.5 or higher, and
- (iii) crystallising the mesotrione out of solution.

The claimed subject matter is:

1. A method for reducing the cyanide levels in a mesotrione sample, said method comprising: (i) taking an aqueous solution of the mesotrione sample in an aqueous solvent, (ii) adjusting the pH of said aqueous solution to a value of 9.5 or higher, and (iii) crystallising the mesotrione out of solution.	Page 2, lines 1 - 6
2. The method of claim 1, wherein the mesotrione sample has previously been isolated and is redissolved in an aqueous solvent.	Page 2, lines 7 – 9
3. The method of claim 1, wherein the mesotrione sample has not previously been isolated and is already present as an aqueous solution in an aqueous solvent.	Page 2, lines 10 – 12
4. The method of claim 3, which further includes a distillation step.	Page 2, lines 30 – 32
5. The method of claim 4, wherein the distillation step is carried out prior to adjusting the pH of the aqueous solution to a value of 9.5 or higher.	Page 2, lines 32 – 34

6. The method of claim 4, wherein the distillation step is carried out after adjusting the pH of the aqueous solution to a value of 9.5 or higher.	Page 2, lines 32 – 34
7. The method according to any one of claim 1 to 6, wherein the crystallisation step also includes a nitrogen sparging step.	
8. A method according to any one of claims 1 to 7, wherein the cyanide levels in the mesotrione sample are reduced to 150ppm or less.	

## **VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL**

- I. Whether claims 1 – 8 are unpatentable under 35 U.S.C. § 103(a) as being obvious over; as being obvious over Javdani et al. (US 7285678) or Ueda et al. (US 4,937,386)<sup>1</sup>.

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<sup>1</sup> The provisional rejection of claims 1 – 8 under judicial doctrine as being unpatentable over claims 1 – 5 of copending, commonly owned application 10/573,723 is not considered to be ripe for appeal.

## VII. ARGUMENTS

- I. Whether claims 1 – 8 are unpatentable under 35 U.S.C. § 103(a) as being obvious over; Javdani et al. (US 7285678) or Ueda et al. (US 4,937,386).

35 USC §103(a) states:

*(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.*

The Examiner rejected claims 1 – 8 under 35 USC §103 as being unpatentable over Javdani et al. (US 7285678) or Ueda et al. (US 4,937,386)

By way of summary, the presently claimed invention relates to a method for reducing the cyanide content of a mesotrione sample. As explained on page 1 of the specification, during the rearrangement process, a mesotrione sample is contaminated with cyanide residues from the acetone cyanohydrin catalyst. A problem addressed by the present invention is to provide a simple, but effective method for reducing the level of cyanide residues in the mesotrione sample to an acceptable level.

It has surprisingly been found that adjusting the pH of a mesotrione sample in aqueous solution has a significant impact on the resulting cyanide levels.

### Javdani:

Javdani teaches a process for the purification of NMSBA - a precursor of mesotrione - which when subsequently used to produce mesotrione generally results in mesotrione containing reduced amounts of undesirable impurities. However, the Javdani process does not guarantee that the mesotrione subsequently produced from the purified NMSBA is free from, or has sufficiently low levels of, cyanide residues (as mentioned on page 1 of the present application). It is this problem which is addressed by the present invention.

In making the rejection, the Examiner suggests that Javdani teaches a process for the preparation of mesotrione and reduction of undesirable impurities in a mesotrione sample. While this may be true – Appellants emphasize that the method taught by Javdani actually involves the purification of NMSBA - a precursor of mesotrione. Only then is the purified NMSBA so produced reacted with 1,3-cyclohexanedione in the presence of a cyanide catalyst to form mesotrione (see

column 1, lines 58-60). Thus it can be seen that the cyanide impurities are introduced into the method taught by Javdani after the purification steps employed in that method. Accordingly, the method of Javdani does not solve the problem of cyanide impurities in the final mesotrione sample. Furthermore, Javdani does not teach any purification steps with regard to the mesotrione sample so produced. Javdani merely adopts the art recognized procedure wherein the mesotrione is precipitated from the reaction mixture through a series of pH adjustment steps and isolated by filtration or centrifugation (column 1, lines 60 – 64). Accordingly, one of ordinary skill will appreciate that the mesotrione sample so produced comprises cyanide impurities – which the method of the present invention solves.

Ueda:

Regarding Ueda, the reference teaches a method (Example 1) for producing 4,4,5-Trimethyl-2-(2-nitro-4-methylsulfonylbenzoyl)cyclohexane-1,3-dione. Appellants note that example 1 therein appears to be a "standard" synthesis process for triketones- certainly there does not appear to be any specific mention of reducing undesired impurities. In a manner analogous to Javdani, Ueda teaches reaction of NMSBA and 4,4,5-trimethyl-cyclohexane-1,3-dione to provide the final product – in the presence of a potassium cyanide catalyst (column 3, line 41). Ueda then teaches the crystallisation of the final product via decreasing the pH.

Accordingly, it can further be seen that Ueda does not teach a method analogous to the method of the present invention – wherein the pH of the aqueous solution is increased to a value of 9.5 or higher and then the mesotrione is crystallised from the solution.

The Examiner has not established a *prima facie* case of obviousness:

Accordingly, Appellants respectfully submit that the Examiner's finding of *prima facie* obviousness is incorrectly determined - as each of the elements of the process of the present invention - as discussed further below - are not specifically taught.

In particular, the purification process of the presently claimed invention requires an aqueous solution of a mesotrione sample - then adjusting the pH to 9.5 or higher- then crystallisation of the mesotrione. Neither Javdani nor Ueda disclose or suggest removal of cyanide residues from mesotrione in the manner specified by the present claims.

A review of the present record reveals that, while the teachings of Javdani and Ueda may relate generally to mesotrione, such references do not suggest the instantly claimed process. More

specifically, Javdani teaches in column 1 that NMBSA can be reacted with phosgene to form a corresponding acid chloride. On the other hand, Ueda column 3, example 1 discloses a process wherein such an acid chloride can be used to prepare a triketone herbicide, but not mesotrione. However, this teaching provides one of ordinary skill with no reasonable expectation that NMSBA produced by the process for the purification of NMSBA of Javdani could be utilized in the process of Ueda to obtain a purified mesotrione, let alone that a mesotrione sample having reduced cyanide levels can be obtained.

Thus, even if one of ordinary skill were to review or combine the prior art teachings in the manner suggested by the Examiner, there would be no reasonable expectation that a mesotrione sample having reduced cyanide levels can be obtained as provided by the presently claimed invention. Accordingly, it is submitted that the claims are not obvious in view of the prior art references cited by the Examiner.

In view of the above arguments, Appellants respectfully submit that the rejection under 35 U.S.C. § 103(a) has been overcome and hereby request that this application be passed to issue.

## VIII. CLAIMS APPENDIX

1. (Original) A method for reducing the cyanide levels in a mesotrione sample, said method comprising:  
  
(i) taking an aqueous solution of the mesotrione sample in an aqueous solvent,  
  
(ii) adjusting the pH of said aqueous solution to a value of 9.5 or higher,  
  
and  
  
(iii) crystallising the mesotrione out of solution.
2. (Original) The method of claim 1, wherein the mesotrione sample has previously been isolated and is redissolved in an aqueous solvent.
3. (Original) The method of claim 1, wherein the mesotrione sample has not previously been isolated and is already present as an aqueous solution in an aqueous solvent.
4. (Original) The method of claim 3, which further includes a distillation step.
5. (Original) The method of claim 4, wherein the distillation step is carried out prior to adjusting the pH of the aqueous solution to a value of 9.5 or higher.
6. (Original) The method of claim 4, wherein the distillation step is carried out after adjusting the pH of the aqueous solution to a value of 9.5 or higher.
7. (Previously presented) The method according to claim 1, wherein the crystallisation step also includes a nitrogen sparging step.
8. (Previously presented) A method according to claim 1, wherein the cyanide levels in the mesotrione sample are reduced to 150ppm or less.

**IX.**

**EVIDENCE APPENDIX**

None

**X. RELATED PROCEEDINGS APPENDIX**

None

Respectfully submitted,

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